REMARKS

A. Amendments to the specification and claims

A grammatical amendment has been made to paragraph [0100] of the published application.

Claim 1 has been amended. This amendment clarifies the operation of a first conjunction "and/or" and a second conjunction "or," and clarifies that sections (b) and (c) of claim 1 relate to each of the first and second mixtures of section (a) of claim 1.

B. The Office Action of December 6, 2007

B.1. Section 1 of the Office Action

In section 1 of the Office Action, 35 U.S.C. 103(a) was set out.

B.2. Section 2 of the Office Action

In section 2 of the Office Action, the factual inquiries of Graham v. John Deere Co. were set out.

B.3. Section 3 of the Office Action

In section 3 of the Office Action, applicant was advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

B.4. Section 4 of the Office Action

In section 4 of the Office Action, claims 1-3 were rejected under 35 U.S.C. 103(a) as being unpatentable over

Nissan Chem., JP 05124818 in view of JSR Corp., JP 2000290589. As to this rejection, please see applicant's discussion in section C. below.

B.5. Section 5 of the Office Action

In section 5 of the Office Action, claims 4-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Adair, Materials Science and Engineering R: Vol. 23 (4-5), p. 139 (1998) in view of JSR Ishikawa, US 6,656,602. As to this rejection, please see applicant's discussion in section C. below.

C. Applicant's discussion

C.1. Introduction

C.1.a. How is applicant's particle including a compound semiconductor covered with a metal oxide?

A technical feature of the present invention is that a particle including a compound semiconductor is covered with a metal oxide by a specific chemical reaction. In the two points of the "particle" and "chemical reaction" in the present invention, there is a difference between the present invention and the prior art. For example, in the Nissan Chem. reference, the JSR Corp. reference and the Ishikawa reference, an oxide coating film is formed on the surface of a sheet-shaped base material by a physical operation "coating." On the other hand, in the present invention, a metal oxide film is formed on the surface of a particulate base material including a compound semiconductor, by a chemical reaction with chemical reactants.

What are applicant's chemical reactants? Please see independent claim 1. In a first case, applicant's chemical

reactants are a metal carboxylate and an alcohol (and a set of particles). In a second case, applicant's chemical reactants are a metal-alkoxy-group-containing compound and a carboxyl-group-containing compound (and a set of particles). The reactants undergo a "heat reaction" such that the particles can be covered with a metal oxide.

C.1.b. What are the purposes of the "heating" and "polish-pulverizing" steps?

In the present application, the purposes of the "heating" step in claim 1 and of the "polish-pulverizing" step in claims 1, 2, 3 and 5 are as follows.

The purpose of the "heating and/or polish-pulverizing" in claim 1 is to provide energy to make a reaction. Please see the discussion as to thermal energy in paragraph [0137] of the published application. In addition, the "polish-pulverizing" in claim 1 also has a purpose to fine the "particle including a compound semiconductor" which is a body particle to be covered with a metal oxide. (It should be noted that the use of "fine" is grammatically correct. "Make fine" would also be grammatically correct.)

The purpose of the "polish-pulverizing" in claim 2 is to fine the "coarse particles of the compound semiconductor" which is a body particle to be covered with a metal oxide.

The purpose of the "polish-pulverizing" in the first step of claim 3 is to fine the "coarse particles of a compound semiconductor" which is a body particle to be covered with a metal oxide.

The "polish-pulverizing" in claim 5 is indispensable to fine the "coarse particles of the compound semiconductor" which is a body particle to be covered with a metal oxide, and does not exclude making a metal oxide film formation reaction under the "polish-pulverizing" (in other words,

utilizing the energy generated by the "polish-pulverizing," for the metal oxide film formation reaction).

C.2. The scope and content of the Nissan Chem. reference

In the Nissan Chem. reference, the base material (having the surface to be covered) is a usual one such as glass, metals, ceramics, plastics, wood and paper. In contrast, applicant's base material (having the surface to be covered) is a particle including a compound semiconductor.

In the Nissan Chem. reference, the objects and effects are to cover a base material with a metal oxide coating film which is high hard, dense, and excellent in chemical resistance (e.g. Abstract). In contrast, in the present invention, the objects and effects are to improve features such as functions peculiar to nano-sized compound semiconductors (e.g. luminosity and luminescence efficiency) (paragraph [0008] of the published specification) and the chemical and thermal durability and the monodispersibility of nano-sized superfine compound semiconductor particles (paragraph [0010] of the published specification).

In the Nissan Chem. reference, a raw material that forms a coating film is coated to a place where a coating film is to be formed, and thereafter the objective coating film is formed from the coated raw material. In other words, the place where a coating film is to be formed is physically controlled.

In contrast, in the present invention, a raw material that forms a metal oxide film is not coated directly to the surface of a particle to be a base material (having the surface to be covered). In addition, in the present invention, a reaction field (or reaction template) where a raw

material that forms a metal oxide film is to be formed by some operation is not provided. Instead, in the present invention, the metal oxide film is formed selectively by chemical reactants on the surface of the particle by a chemical reaction.

In addition, the reactions in the Nissan Chem. reference are hydrolysis and condensation reactions.

In contrast, the present invention was made by finding a metal oxide formation reaction which could form a metal oxide film directly on the surface of the particle (without needing a post-treatment) as well as a combination of raw materials (chemical reactants) for the reaction. Hereupon, the chemical reaction of the present invention differs from the hydrolysis and condensation reactions of the Nissan Chem., reference.

In addition, in the present invention, what is physically provided is only a means to provide heat necessary for the chemical reaction (i.e. heating and/or polish-pulverizing).

C.3. The scope and content of the JSR Corp. reference

In the JSR Corp. reference, like the Nissan Chem. reference, the base material (having the surface to be covered) is a usual one such as glass, metals, ceramics, plastics, wood and paper. Again, in contrast, applicant's base material (having the surface to be covered) is a particle including a compound semiconductor.

In the JSR Corp. reference, the objects and effects are to cover a base material with a coating film which is excellent in appearance, adhesion, weather resistance, high hardness, and ultraviolet absorbency to prevent deterioration of a substrate (e.g. Abstract). In contrast, again, in the present invention, the objects and effects are to improve features such as functions peculiar to compound

semiconductors (e.g. luminosity and luminescence efficiency) (paragraph [0008] of the published specification) and the chemical and thermal durability and the monodispersibility of nano-sized superfine compound semiconductor particles (paragraph [0010] of the published specification).

In the JSR Corp. reference, a raw material that forms a coating film is coated to a place where a coating film is to be formed, and thereafter the objective coating film is formed from the coated raw material. In other words, the place where a coating film is to be formed is physically controlled.

In contrast, in the present invention, a raw material that forms a metal oxide film is not coated directly to the surface of a particle to be a base material (having the surface to be covered). In addition, in the present invention, a reaction field (or reaction template) where a raw material that forms a metal oxide film is to be formed by some operation is not provided. Instead, in the present invention, the metal oxide film is formed selectively by chemical reactants on the surface of the particle by a chemical reaction.

In addition, the reactions in the JSR Corp. reference are hydrolysis and condensation reactions.

In contrast, the present invention was made by finding a metal oxide formation reaction which could form a metal oxide film directly on the surface of the particle (without needing a post-treatment) as well as a combination of raw materials (chemical reactants) for the reaction. Hereupon, the chemical reaction of the present invention differs from the hydrolysis and condensation reactions of the JSR Corp. reference.

In addition, in the present invention, what is physically provided is only a means to provide heat necessary

for the chemical reaction (i.e. heating and/or polish-pulverizing).

C.4. Differences between independent claim 1 and the combination of Nissan Chem. and JSR Corp.

First, in view of the differences as aforementioned in sections C.2. and C.3. between the present invention and each of the Nissan Chem. reference and JSR Corp. reference as to the base material (having the surface to be covered) and as to the objects and effects, a skilled artisan would not have combined these references to make the present invention as claimed in independent claim 1. For example, the present invention relates to nano-sized quantum particles, whereas the Nissan Chem. and JSR Corp. references relate to a macroscopic art.

On this first ground, it is respectfully submitted that independent claim 1 is allowable on the basis of the differences from these references.

Second, in the present invention, the raw material that forms the metal oxide film is either a combination of a metal carboxylate (reactant A) and an alcohol (reactant B), or a combination of a metal-alkoxy-group-containing compound (reactant C) and a carboxyl-group-containing compound (reactant D). In the metal oxide film formation reaction of the present invention, the above two reactants (A and B, or C and D) react together to form a metal oxide film on the surface of a compound semiconductor body particle.

None of the cited prior art documents, including Nissan Chem. and JSR Corp., discloses or suggests such a combination of the above two reactants as raw materials that form a metal oxide film or discloses or suggests such a metal oxide film formation reaction of the two reactants to

form a metal oxide film. The reactions of Nissan Chem. and JSR Corp. are hydrolysis and condensation reactions, which differ from the reaction of the present invention.

On this second ground, it is respectfully submitted that independent claim 1 is allowable on the basis of the differences from these references.

C.5. As to dependent claim 2

Dependent claim 2 is dependent upon independent claim 1. The discussion as to claim 1 is relevant and is hereby incorporated by reference. It is respectfully submitted that dependent claim 2 is allowable on the basis of the first and second differences pointed out as to independent claim 1.

Moreover, it is respectfully submitted that dependent claim 2 is allowable on the basis of the following.

Dependent claim 2 positively recites:

- polish-pulverizing coarse particles of the compound semiconductor.

However, neither Nissan Chem. nor JSR Corp. disclose or suggest polish-pulverizing. Thus, dependent claim 2 is allowable on the basis of this third difference.

C.6. Differences between independent claim 3 and the combination of Nissan Chem. and JSR Corp.

Independent claim 3 claims:

- a production process for compound semiconductor particles; and
- polish-pulverizing coarse particles of a compound semiconductor.

As to independent claim 3, the discussion as to independent claim 1 is relevant and incorporated here by

reference. It is respectfully submitted that independent claim 3 is allowable on the basis of this first difference, i.e., the positive recitation of a compound semiconductor.

It is respectfully submitted that independent claim 3 is allowable on the basis of the following.

Independent claim 3 positively recites:

- polish-pulverizing coarse particles of a compound semiconductor.

However, neither Nissan Chem. nor JSR Corp. disclose or suggest polish-pulverizing. Thus, independent claim 3 is allowable on the basis of this second difference.

C.7. The scope and content of the Adair reference

First, it should be noted that the full text of the Adair reference is being submitted via an Information Disclosure Statement dated the same date as this Amendment and Remarks. The Examiner had cited only the first page of this reference on the Notice of References Cited so, to ensure that the full text of this reference has been considered, applicant submits such full text via said Information Disclosure Statement.

In the Adair reference, the objects and effects are to enhance the third-order non-linear susceptibility of a compound semiconductor particle. In contrast, in the present invention, the objects and effects are to improve features such as functions peculiar to compound semiconductors (e.g. luminosity and luminescence efficiency) (paragraph [0008] of the published specification) and the chemical and thermal durability and the monodispersibility of nano-sized superfine compound

semiconductor particles (paragraph [0010] of the published specification).

The Adair reference only discloses hydrolysis and condensation reactions as metal oxide formation reactions.

In contrast, the metal oxide formation reaction of the present invention differs from the hydrolysis and condensation reactions of Adair, whether the present invention includes 1) the chemical reaction between metal carboxylate and an alcohol or 2) the chemical reaction between a metal-alkoxy-group containing compound and a carboxyl-group containing compound, each of which is positively recited in independent claim 1.

In addition, in the art of the Adair reference, a nano-level reaction field (or reaction template) as formed by a surfactant is provided, and hydrolysis and condensation reactions are conducted in the reaction field (or reaction template), thereby obtaining a dispersion in which nano-composite particles comprising compound semiconductor particles (e.g. CdS) and a metal oxide (e.g. silica, titania) that coexist in the reaction field (or reaction template) are dispersed. That is to say, since the reactions are already existing arts, the reactions cannot successfully be conducted unless the reaction field (or reaction template) is provided.

In contrast, the metal oxide formation reaction of the present invention does not need such a particular reaction field (or reaction template).

In more detail, Adair discloses an art in which a micelle structure as formed by molecules of a surfactant is controlled and used as a reaction template, in other words, a reaction field, to form nano-scale inorganic anisotropic particles. In the micelle, nano-sized composite particles of a metal oxide and nano-sized compound semiconductor particles (e.g. CdS) are formed by hydrolysis and condensation reactions under the coexistence of the nano-sized compound semiconductor

particles (e.g. CdS).

For example, Adair discloses that a plate-shaped (platelet) CdS particle is obtained by utilizing a space as limited by bilayers resulting from lamellar orientation of a surfactant. Lamellar bilayers containing Cd^{2+} ion and lamellar bilayers containing S^{2-} ion are prepared, and they are mixed together, so that CdS crystal particles are formed in lamellar bilayers.

Then, for example, nano-sized composite particles of CdS particles with silica as an example of the metal oxide are synthesized as follows.

Nuclear particles of CdS are formed in a reversed-phase micelle, and thereto a basic catalyst (catalyst for hydrolysis) is added, and further, tetraethoxysilane (TEOS) is added. As a result, hydrolysis and condensation reactions take place with water in the micelle to form nano-sized composite particles of silica and CdS particles.

Hereupon, TEOS may be replaced with a modified titanium alkoxide to obtain nano-sized composite particles of titania (titanium oxide) and CdS particles in the same way.

C.8. The scope and content of the Ishikawa reference

The base material (having the surface to be covered) in the Ishikawa reference is also a usual one such as synthetic resins and paper. Again, in contrast, applicant's base material (having the surface to be covered) is a particle including a compound semiconductor.

In the Ishikawa reference, the objects and effects are to cover a base material with a coating film which is excellent in gas barrier properties (a-g, Abstract). In contrast, again, in the present invention, the objects and effects are to improve features such as functions peculiar to compound semiconductors (e.g. luminosity and

luminescence efficiency) (paragraph [0008] of the published specification) and the chemical and thermal durability and the monodispersibility of nano-sized superfine compound semiconductor particles (paragraph [0010] of the published specification).

In the Ishikawa reference, a raw material that forms a coating film is coated to a place where a coating film is to be formed, and thereafter the objective coating film is formed from the coated raw material. In other words, the place where a coating film is to be formed is physically controlled.

In contrast, in the present invention, a raw material that forms a metal oxide film is not coated directly to the surface of a particle to be a base material (having the surface to be covered). In addition, in the present invention, a reaction field (or reaction template) where a raw material that forms a metal oxide film is to be formed by some operation is not provided. Instead, in the present invention, the metal oxide film is formed selectively by chemical reactants on the surface of the particle by a chemical reaction.

In addition, the reactions in the Ishikawa reference are hydrolysis and condensation reactions.

In contrast, the present invention was made by finding a metal oxide formation reaction which could form a metal oxide film directly on the surface of the particle (without needing a post-treatment) as well as a combination of raw materials (chemical reactants) for the reaction. Hereupon, the chemical reaction of the present invention differs from the hydrolysis and condensation reactions of the Ishikawa reference.

In addition, in the present invention, what is physically provided is only a means to provide heat necessary for the chemical reaction (i.e. heating and/or polish-pulverizing).

C.9. Differences between independent claim 4 and the combination of Adair and Ishikawa

First, in view of the differences as aforementioned in sections C.7. and C.8. between the present invention and each of the Adair reference and Ishikawa reference as to the objects and effects, a skilled artisan would not have combined these references to make the present invention as claimed in independent claim 4. On this first ground, it is respectfully submitted that independent claim 4 is allowable.

Second, applicant agrees with the Examiner that Adair fails to teach the limitation "wherein the metal oxide is a metal oxide to which an acyloxyl group is bonded."

The Examiner asserts Ishikawa to cure such a deficiency.

In the present invention, the raw material that forms the metal oxide film is either a combination of a metal carboxylate (reactant A) and an alcohol (reactant B), or a combination of a metal-alkoxy-group-containing compound (reactant C) and a carboxyl-group-containing compound (reactant D). In the metal oxide film formation reaction of the present invention, the above two reactants (A and B, or C and D) react together to form a metal oxide film and an acyloxyl group bonded thereto, on the surface of a compound semiconductor body particle.

None of the cited prior art documents, including Adair and Ishikawa, discloses or suggests such a combination of the above two reactants as raw materials that form a metal oxide film or discloses or suggests such a metal oxide film formation reaction of the two reactants to form a metal oxide film and an acyloxyl group bonded thereto. The Examiner points out that the Ishikawa reference discloses a

metal acylate compound as a raw material that forms a coating film. However, the reactions of the Ishikawa reference using the metal acylate compound as a raw material that forms a coating film are hydrolysis and condensation reactions, and therefore an acyloxyl group possessed by the metal acylate compound does not remain as a result of the reactions.

Thus, even if the Adair and Ishikawa references are combined, such a combination does not teach what is positively claimed in independent claim 4. Accordingly, it is respectfully submitted that independent claim 4 is allowable on the basis of this second ground.

C.10. As to dependent claim 5

Dependent claim 5 is dependent upon independent claim 4. The discussion as to independent claim 4 is relevant and is hereby incorporated by reference. It is therefore respectfully submitted that dependent claim 5 is allowable.

D. Housekeeping matters

D.1. Period For Reply

This paper is being filed in response to the Office Action of December 6, 2007. December 6, 2007 plus three months is March 6, 2008. March 6, 2008 plus one month is Sunday, April 6, 2008. This paper is being filed on or before Monday, April 7, 2008 with a petition for extension of time of one month.

D.2. Status

The Office Action of December 6, 2008 was nonfinal.

D.3. Disposition Of Claims

Claims 1-5 are pending.

D.4. Application Papers

The drawings filed on February 22, 2005 were accepted by the Examiner. This is appreciated.

D.5. Priority under 35 U.S.C. §§ 119 and 120

Acknowledgement of the claim for foreign priority is appreciated.

D.6. Attachments

Applicant has filed four PTO-1449 forms in this case (two on May 21, 2005 and two on November 9, 2006). All four PTO-1449 forms have been returned with signature. All of the listings of references on the forms have been initialed except for the JP 1-161064 reference on page one of two of the PTO-1449 form of November 9, 2006. If such reference on such page could be reviewed and initialed, and the page returned to applicant, this would be very much appreciated.

E. Summary

Applicant respectfully submits that the present application is now in condition for allowance. The Examiner is respectfully invited to make contact with the undersigned by telephone if such would advance prosecution of this case.

Respectfully submitted,

Date: 3-24-08

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